Summer/Fall 2014

National Weather Service, Reno, NV

The Gold and Silver Spotter

Inside this issue:

Our Active Summer

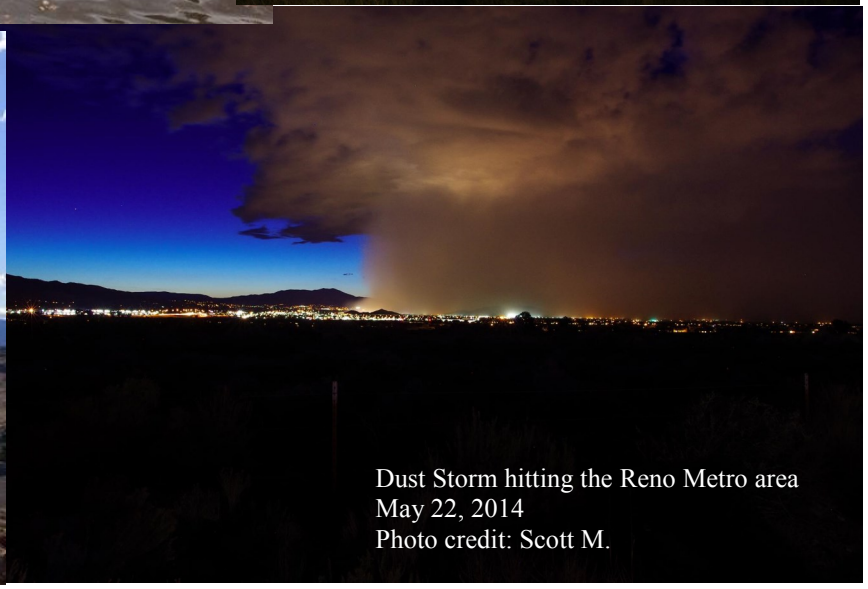
If you like thunderstorms, then this was the summer for you! An active summer created a setup for thunderstorms, hail, heavy rain with flooding, dust storms, and wildfires. The reason for such an active season was a combination of several potent areas of low pressure moving into the region and modified monsoonal moisture being advected northward into the Sierra and western Nevada. The especially wet nature of the thunderstorms lead to many locations receiving 250-1000% of their monthly average rainfall in August. Unfortunately this did little to alleviate the drought and many of these August averages were only a couple tenths of an inch. The rains helped in the short term and definitely eased fire concerns for the start of fall, but the long term drought remains.

Hail covering roadway
August 25, 2014
Courtesy of CalTrans Webcam


Flooding -Jessie Beck Elementary in Reno
August 11, 2014
Photo credit: KTVN Channel 2


Thunderstorms
August 6, 2014
Photo credit: Ian C.


The Hunter Falls Fire
May 18, 2014
Photo credit: NWS Employee


Dust Storm hitting the Reno Metro area
May 22, 2014
Photo credit: Scott M.

Flash Flooding or Not?

Spotter reports were instrumental in verifying flash flooding this summer, especially in Douglas County and in Carson City in July and August where two heavy rain-induced flash flooding events caused significant damage. Crucial to confirming flash flooding are a few key concepts which can make all the difference between a verifiable event and an ambiguous, unusable report.

A flash flood is defined as **a rapid and extreme flow of high water into a normally dry area, or a rapid water level rise in a stream or creek to above flood stage, beginning within six hours of the causative event (i.e. heavy rainfall).** The flash flooding typically must *threaten life or property* to be considered a flash flood versus minor "nuisance" flooding. Minor nuisance flooding might include ponding of water beneath an underpass due to a short period of heavy rain combined with poor urban drainage. A flash flood might be an overflowing creek which flows swiftly over a road, threatening to sweep cars or people away. This is just one example and the determination of flash flooding is subjective. However, the more specific information that can be given the better. **Videos are especially helpful** when determining flash floods as a photo cannot always relay the character of flowing water well. You can upload videos to the NWS Facebook or Twitter pages or even share your own YouTube videos with the NWS. As always, your safety takes priority over any videos or pictures!

Finally, when reporting flash flooding to the NWS you may be asked certain questions related to the nature of the flooding. Here are a few possible examples: Is the water moving swiftly? How deep is the moving water (6 inches can be significant)? Is the water threatening any structures, homes or roads? Are any roads or bridges closed? Can you estimate the time that the flooding started?

To wrap up, I would like to thank our spotters for volunteering to assist the NWS in its public service mission. The reports, videos and pictures this past summer were crucial in verifying a number of flash floods. Your diligence is always appreciated!

-Shane Snyder
Verification Focal Point

An example of flash flooding washing out Highway 447, summer 2013. Photo credit: Jonathan P.A.

An example of street flooding due to heavy rainfall and poor drainage, summer 2014. Photo credit: Susie H.

Next SkyWarn Spotter Talk—November 18

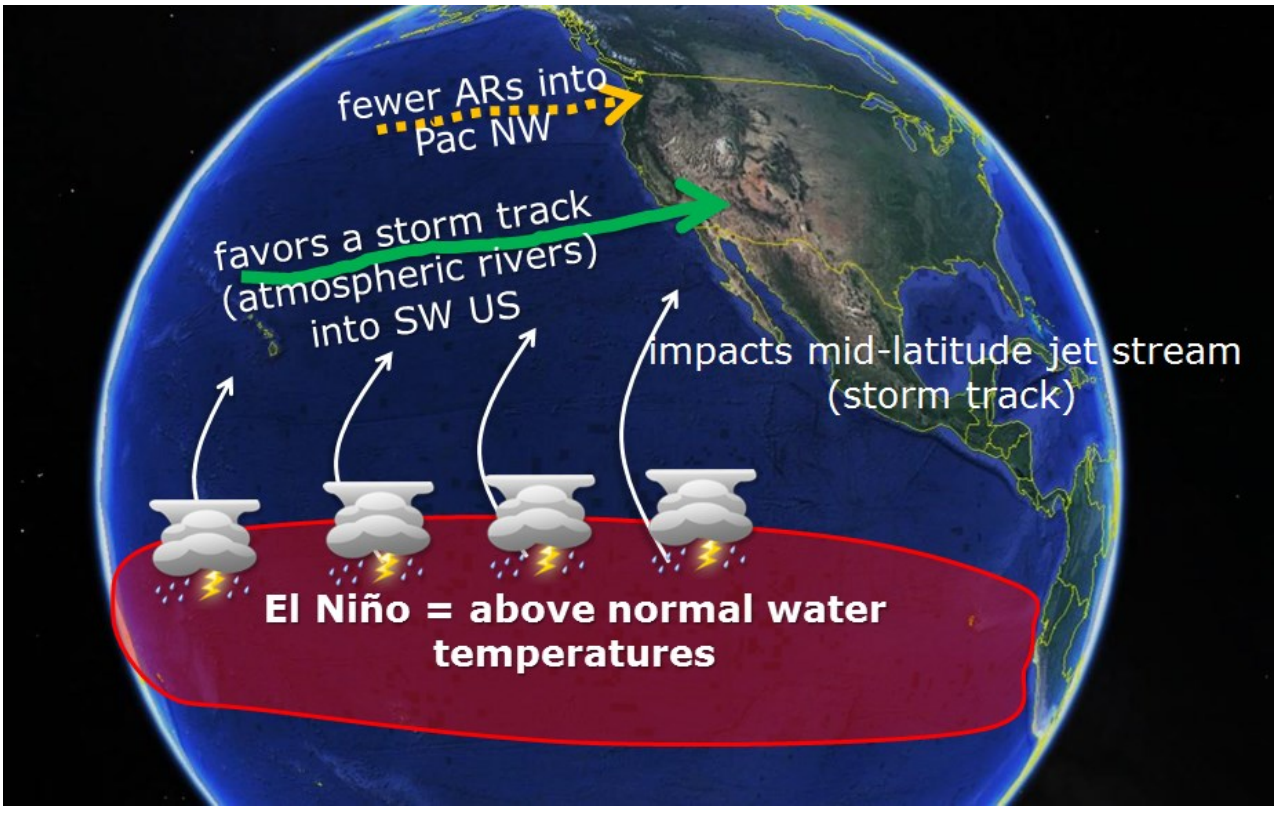
We will be hosting a virtual spotter talk at 6 pm on Tuesday, November 18 with a focus on winter weather. If you need a refresher or know anyone who might be interested in becoming a weather spotter, please join us! The talk will be from 6-7:30 pm with an hour focused on weather information and half an hour saved for questions. Registration can be found here: **https://www1.gotomeeting.com/register/372599497** and will be limited to the first 50 registrants. If you have any questions, please email: Dawn.Johnson@noaa.gov.

The Return of El Niño?

- The Climate Prediction Center (CPC) has decreased the chances of an El Niño developing from 85% to 60-65%.
- Even with this drop, El Niño conditions are still favored to develop by the majority of forecast models.
- It is far too early to predict the strength, especially since it is not definitive that an El Niño will develop.
- For it to be considered an El Niño episode, the ONI (see page 4) average needs to be at least 0.5 degrees Celsius above normal for at least 3 months.
- The ONI for the July-August-September 2014 period was 0.0, translating to neutral conditions.

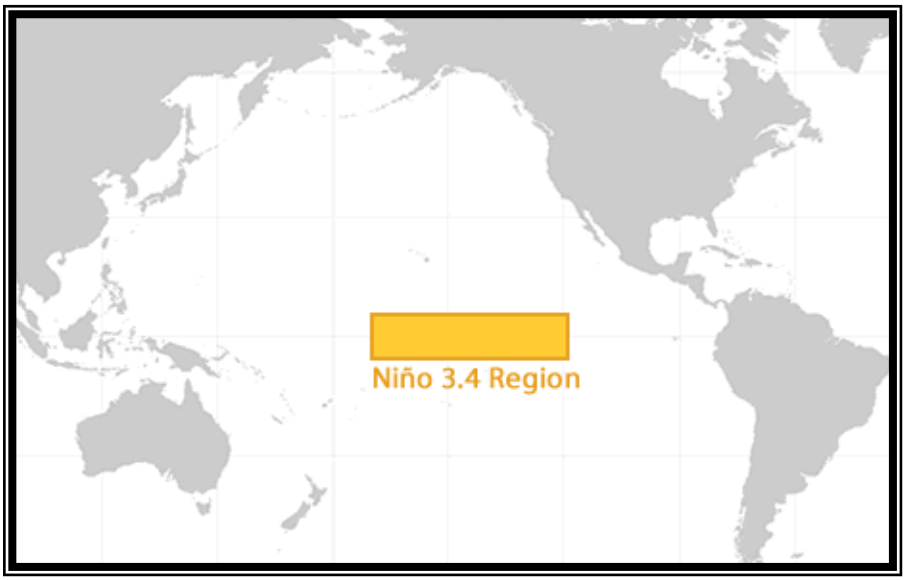
Will El Niño Save The Winter and End the Drought?

Despite all the hype over El Niño, in a nutshell the answer is NO. The graphic below is a very basic depiction of what occurs during an El Niño, where the storm track is favored to push into the Southwestern US, with fewer atmospheric rivers (ARs) into the Pacific Northwest. Northeast California and northwest Nevada is situated right between these two extremes, giving us no real correlation between El Niño and precipitation amounts. In fact, studies for this area have been all over the map regarding how much precipitation we get during El Niño, La Niña, or ENSO neutral conditions. Picture a scatterplot where you are throwing darts with a blindfold on — that is literally how little correlation there is! Therefore, our confidence in the amount of precipitation we will see this winter remains very low. With the extreme deficit of the past 3 winters, the area would need to see over 200% of normal this winter to even reach normal (see page 5 for more details), so, unfortunately it doesn't look like the drought will end, but we can certainly hope for improvement.

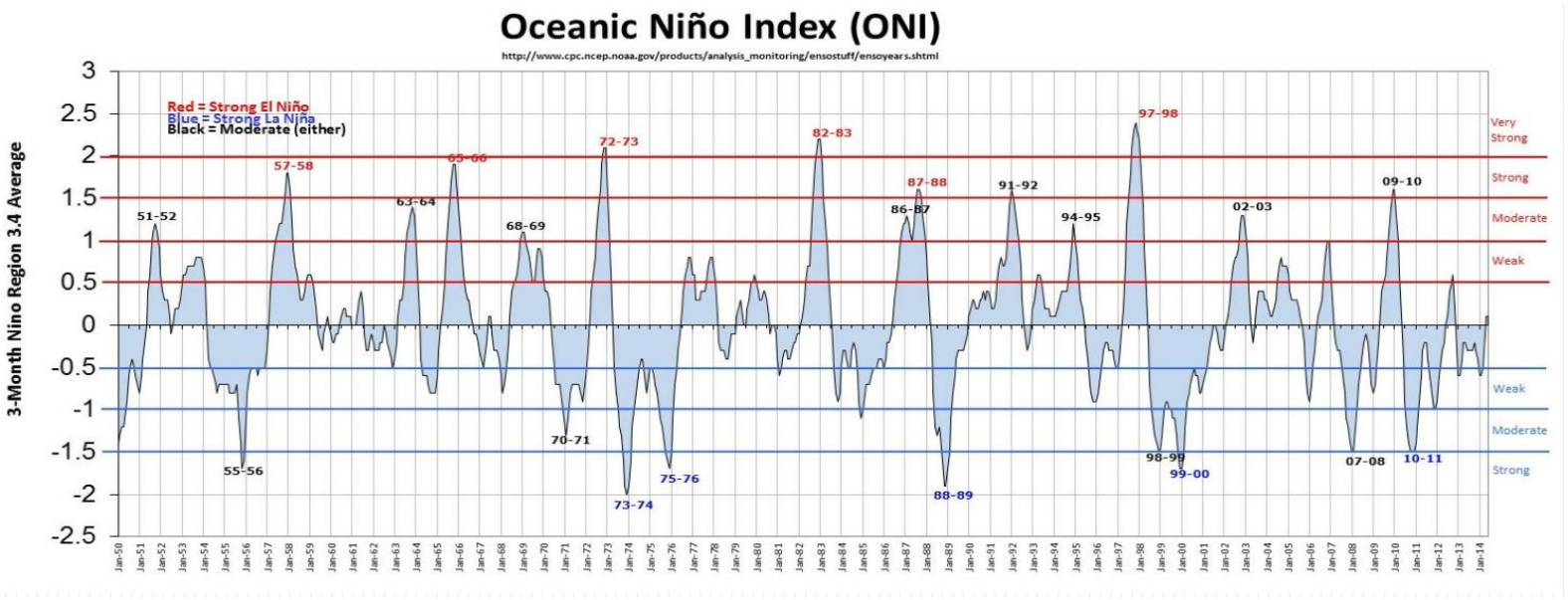


The Oceanic Niño Index (ONI)

The Oceanic Niño Index (ONI) is a measure of the departure from the normal sea surface temperature in the east-central Pacific Ocean in an area referred to as the Niño 3.4 Region. This is the standard by which the strength of El Niño and La Niña episodes are measured. The average sea surface temperature in the Niño 3.4 Region is calculated each month and then averaged with values from the previous month and following month. The running three-month average is then compared with the average sea surface temperature for the same three months during 1981-2010 giving a value for the ONI. Positive values of 0.5°C or greater reference the warm phase, or El Niño, while negative values of 0.5°C or less reference the cold phase, or La Niña.



Below: The ONI from Jan 1950-Jan 2014

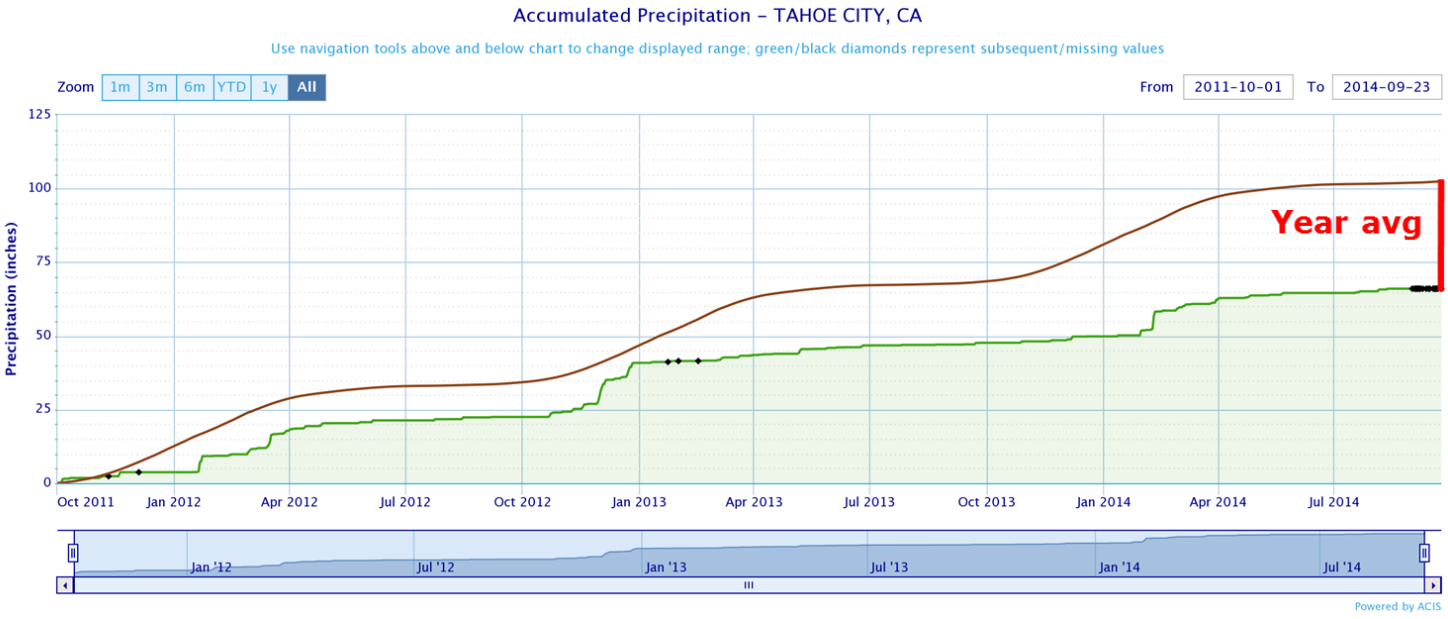


Why is the Winter Outlook so hard to Forecast?

Seasonal prediction science is advancing, but is where daily weather forecasts were 20-30 years ago, which means confidence tends to be low. For our area, the majority of our winter precipitation will come from a few atmospheric river events and these are impossible to predict weeks or months ahead. For more details on atmospheric rivers, see page 6. As already mentioned on page 3, El Niño (and La Niña for that matter) have little bearing on our winter weather. The other wildcard is an anomalous warm area in the northeast Pacific Ocean, which has no relation to El Niño, but was present last winter as well and was associated with keeping the storm track well to the north while our region sat under a strong area of high pressure. Only time will tell what this winter has in store! If you'd like to check out our winter outlook 2-part YouTube video series, please visit: http://goo.gl/5F3UYJ.

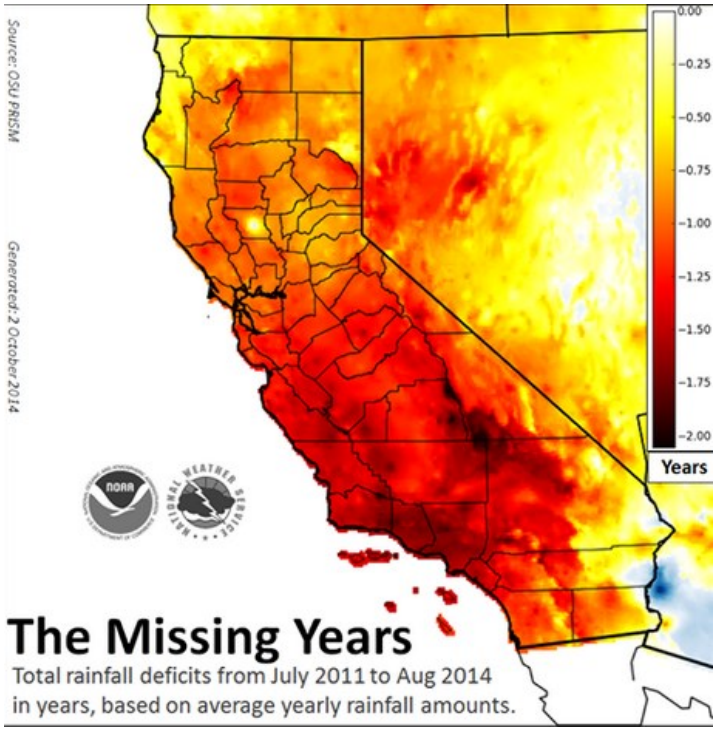
How Much Precipitation Would We Need to End the Drought?

The widespread rain and high elevation snow the last weekend of September was a welcome relief from the dry as of late, but barely registered a blip in the grand scheme of things. We are around a year behind average in precipitation accumulation at many sites around northeast California and northwest Nevada, with the graph below showing accumulated precipitation at Tahoe City from Oct 1, 2011-September 23, 2014 as an example. The green shaded area is the actual amount of precipitation the site has seen, while the brown line is the average precipitation totals. The difference between the two is equivalent to a year of precipitation. We would need a winter with greater than 2 times average to even reach normal! This is more than we saw during our huge winter of 2010-2011 (moderate to strong La Niña) or for those who remember the winter of 1982-1983 (strong El Niño) . With this in mind, we are likely going to need several years of well above average precipitation to truly end the drought.



The graphic on the right is visualizing the current drought in terms of "missing years of rain". The rainfall totals were added up from July 2011 through August 2014, then compared to precipitation averages which would typically fall in a given year. The results are startling with many locations in northeast California, the Sierra, and northwest Nevada at least a year behind their average annual precipitation.

Thanks to NWS Hanford for the graphical depiction!



Atmospheric Rivers (ARs)

Atmospheric Rivers are relatively narrow regions of the atmosphere that are responsible for the majority of the transportation of water vapor outside of the tropics. The size and shape can vary, but they are typically only 250-400 miles wide and just a few of these events usually make up close to 50% of our total winter precipitation. A strong atmospheric river can transport the amount of water vapor roughly equivalent to 7.5-15 times the average flow of liquid water at the mouth of the Mississippi River — just think of what that could equate to precipitation-wise in the Sierra. The best scenario for our area is to have the moisture wrapping into a cold area of low pressure because this will be a situation that could give 8-10 feet of snow in the Sierra from one storm. The worst set up is having a large low-elevation snowpack followed by a very warm atmospheric river event. This is what caused the major flooding in both 1997 and 2004/5.

Do You Take Daily Precipitation Measurements?

Many of you already call us with daily precipitation reports, and while this is definitely not necessary, we appreciate your dedication! If this is something you are interested in doing daily, there is another volunteer network known as CoCoRaHS, or the Community Collaborative Rain, Hail, and Snow Network. CoCoRaHS is a non-profit, community base of volunteers who work together to map precipitation (rain, hail, and snow) across all 50 states. Anyone is welcome to participate, the only requirement is enthusiasm for watching and reporting weather conditions and a desire to learn how weather can impact our lives. As a volunteer you take measurements of precipitation each time rain, snow, or hail crosses your area. These reports are then logged onto the CoCoRaHS network and are used by a wide variety of individuals including us at the National Weather Service, other meteorologists, hydrologists, emergency managers, city utilities, USDA, engineers, ranchers, farmers, and the list goes on. By participating in the CoCoRaHS network you are providing an important piece of the weather puzzle that affects so many across your local area. If you are interested in learning more information or even signing up, please visit www.cocorahs.org or email Wendell.Hohmann@noaa.gov.

CoCoRaHS
Community Collaborative Rain, Hail & Snow Network

"Because every drop counts"